

Ionic Liquid, Nontoxic Monopropellants for Power-Limited Spacecraft, Phase I

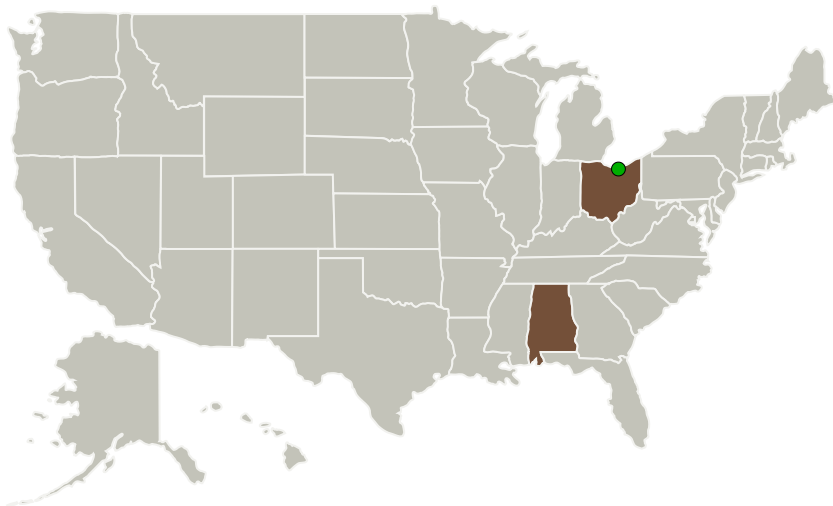
Completed Technology Project (2012 - 2012)



Project Introduction

A key requirement of modern chemical energetic materials include enhanced performance, reduced sensitivities, and reduced toxicity. A class of compounds that meet these requirements is Ionic Liquids (ILs). The physicochemical properties of ILs enable their use in a variety of applications and energetic ionic liquids (EILs) is an area of intense research in the last decade. C3 Propulsion proposes the study and development of advanced ionic liquid, non-toxic monopropellants featuring an innovative combination of anions and cations that will enable high duty cycle, extended operation of power-limited spacecraft. This Phase I effort will demonstrate the feasibility of non-toxic monopropellants for power-limited spacecraft. This effort will build on a successful project that built and tested an on-demand EIL gas generator. The project will extend past work on non-toxic EIL monopropellants, test different anion/cation combinations to seek optimization of the EIL, and conduct studies of the catalyst bed to identify the optimal distribution and modality. In Phase II, the development and optimization of the EIL monopropellant system will continue. This will include targeting improvement of the flow control valves, propellant injectors, and thrust chamber catalyst bed design for use with the selected low toxicity monopropellant. Programmatically, there will be an aggressive push towards flight-like hardware to ensure rapid maturation of the technology in order to meet the NASA mission goals.

Primary U.S. Work Locations and Key Partners



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Organizations Performing Work	Role	Type	Location
Streamline Automation, LLC	Lead Organization	Industry	Huntsville, Alabama
● Glenn Research Center(GRC)	Supporting Organization	NASA Center	Cleveland, Ohio

Primary U.S. Work Locations	
Alabama	Ohio

Project Transitions

February 2012: Project Start

August 2012: Closed out

Closeout Documentation:

- Final Summary Chart(<https://techport.nasa.gov/file/138237>)

Organizational Responsibility

Responsible Mission Directorate:

Space Technology Mission Directorate (STMD)

Lead Organization:

Streamline Automation, LLC

Responsible Program:

Small Business Innovation Research/Small Business Tech Transfer

Project Management

Program Director:

Jason L Kessler

Program Manager:

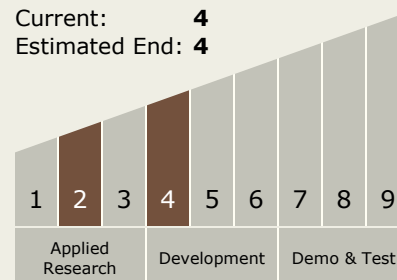
Carlos Torrez

Principal Investigator:

Roberto Di Salvo

Technology Maturity (TRL)

Start: 2
Current: 4
Estimated End: 4



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Technology Areas

Primary:

- TX01 Propulsion Systems
 - └ TX01.1 Chemical Space Propulsion
 - └ TX01.1.1 Integrated Systems and Ancillary Technologies

Target Destinations

The Moon, Mars, Outside the Solar System, The Sun, Earth, Others Inside the Solar System